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A COMPUTER SIMULATION OF A STATEWIDE FILM LIBRARY NETWORK--A FEASIBILITY STUDY FOR ACTUAL OPERATION. FINAL REPORT.

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TO COMBAT INEFFICIENCY IN FILM USE IN NEW YORK STATE SCHOOLS, THIS STUDY SOUGHT A WAY OF OFFERING TO TEACHERS GREATER FLEXIBILITY IN THE ORDERING, SCHEDULING, AND UTILIZATION OF FILMS. DATA WAS GATHERED ON FILM LIBRARY INVENTORIES, BOOKING RECORDS, TEACHER PREFERENCES, AND SYSTEM COSTS. TEACHER PREFERENCE DATA CURVES WERE INCONSISTENT WITH FILM AVAILABILITY CURVES, BUT COMPUTER SIMULATIONS PROJECTED THIS DATA INTO A MORE EFFICIENT FUTURE SYSTEM AND FOUND THAT A CENTRAL COMPUTERIZED BOOKING, DISTRIBUTION, AND BOOKKEEPING SYSTEM FOR ALL EDUCATIONAL ORGANIZATIONS IN NEW YORK IS INDEED FEASIBLE. FINALLY, COSTS OF A COMPUTER SYSTEM ARE DISCUSSED, AND FURTHER STUDY OF EFFICIENT FILM DISTRIBUTION METHODS (SUCH AS VIDEOTAPE RECORDERS ON A STATEWIDE TV NETWORK) ARE RECOMMENDED. (LH)

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September, 1966

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
Office of Education
Bureau of Research

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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A COMPUTER SIMULATION OF A STATEWIDE FILM LIBRARY NETWORK: A FEASIBILITY STUDY FOR ACTUAL OPERATION

Eugene K. Oxhandler
Fred L. Christen

September, 1966

The research reported herein was performed pursuant to a contract with the Office of Education, U. S. Department of Health, Education, and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgement in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

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CHAPTER I

INTRODUCTION

THE PROBLEM

The motion picture has been an integral part of our educational structure for many years. Great impetus for its use was given by the Armed Forces training programs during World War II. Since that time the educational motion picture industry has enjoyed a continued expansion of both the number of new titles produced each year and the volume of sales to educational organizations. Dr. James Finn (2) documents a similar steady rise in the acquisition of 16mm motion picture projectors by school districts since 1946.

Noting this sustained increase in the acquisition of equipment and materials by educational organizations, one might be led to believe that the educational film is truly an effective and widely used instructional tool. However, this does not seem to be the case. Recent studies of film utilization by elementary and secondary teachers (1,3,4,6) indicate that a paradox seems to exist. Admittedly, there has been a great expansion in expenditures for material and equipment since World War II; yet, no marked increase in utilization has been forthcoming. Some of the factors that contribute to this paradox are:

1. A limited selection of film titles available to the teacher.,

2. Extensive delays between the request for a film, the confirmation or denial of that request, and the final delivery of the film to the classroom.,

3. A lack of standardized procedures for purchasing, maintaining, booking, confirming and delivering of films,

4. Unimaginative and unscientific acquisition procedures by film library directors.,

5. A lack of adequate means for collecting and analyzing data as an aid to long range planning for film services, and,

6. To some degree, a lack of knowledge about film utilization once the film reaches the classroom teacher.,

The first five of these factors are the direct concern of this study. The sixth lies beyond the scope of the present effort. While its importance is not denied, its investigation will have to wait until a later time.

BACKGROUND

The fact that the educational film is not utilized as effectively and efficiently as it might be can be explained from both an economic and a logistic point of view.

Economic Reasons

Motion pictures in the 16mm format are expensive to purchase, maintain, distribute and use. Ten minutes of black and white sound film costs $50 to $75. The price is doubled for color. A 16mm sound motion picture projector costs approximately $500, plus about $25 per year for maintenance. In addition, the films must be catalogued, stored, distributed and maintained. This generally takes a major portion of the time of an audiovisual coordinator and a clerk-technician whose combined salaries usually approach $11,000 per year.

A normal United States' school district of 5,000 students consists of five elementary schools, two junior high schools and one senior high school, and employs 250 to 300 teachers. To provide such a district with a film library of 500 titles and the recommended minimum of one projector for every five teachers would cost an estimated $35,000 per year when films and projectors are amortized over a five year period.

This high cost of film services has led administrators and school boards to the cooperative purchase, storage, maintenance and distribution of educational motion pictures. Many of these cooperative arrangements have evolved into county or regional centers. In New York State, they are housed, for the most part, in the Boards of Cooperative Educational Services (BOCES).

BOCES normally serve a large number of districts with from 15,000 to 50,000 pupils and up to 3,000 teachers. In New York State, there are now 20 BOCES with film collections ranging from 250 to 2,200 films. New York State also has a dozen private film distribution centers (including the Syracuse University Film Rental Library) with holdings ranging from 300 to 8,000 films. There are 14 individual school districts with film holdings exceeding 500. New York City alone has some 35,000 prints of 3,000 different titles. A rough estimate of the total film holdings in the BOCES is in excess of 14,000; in the private libraries 24,000; and in the larger districts, excluding New York City, 13,000, giving an estimated grand total of 51,000 films valued at over $5,000,000.

Despite this impressive display of film resources, school districts have still not begun to approach the goal of providing their teachers with the films they want, when they want them. As late as 1964, fifty percent (50%) of the teachers within one of the oldest and best established BOCES film library's service area complained that they were generally not able to get the films they wanted for use at the time they needed them (4,p.231).

Logistic Reasons

Any collection of items -- books, films, pictures, etc., that is in demand by any group creates problems of equitable dissemination. Because of their expense and their need to be inspected and cleaned after each use, films present an extremely complex distribution problem.

Several patterns of film ownership and distribution have evolved over the years. There are small film cooperatives, film rental libraries and even large regional or county collections purchased and maintained jointly by a number of school districts. Each of these patterns has its advantages, usually, it would seem, overbalanced by its disadvantages.

Local Cooperatives

In this arrangement, all participating schools contribute a given number of films to a central collection. The collection is usually housed in a school or local college where inexpensive student help is available. Shipments are made weekly, either by mail, truck or teacher pickup. Films are ordered as much as a year in advance since there aren't enough films to go around. Thus, the school that places its orders first gets its titles when its teachers want them, the rest get what's left.

Funds for the operation of such local cooperatives are provided by a small assessment, usually no more than fifty cents ($.50) per pupil, per year. This type of film library usually suffers from poor scheduling, inadequate maintenance and unimaginative acquisition practices.

Private Rental Libraries

The private rental library attempts to maintain a large number of titles over broad curricular areas. It also trys to anticipate the needs of its clients by fairly imaginative purchasing procedures. Multiple prints are stocked to somewhat alleviate seasonal booking problems.

Most rental libraries are housed at major universities and are operated for profit although those based in state supported universities may work on a cost-plus base. Charges, therefore, are dependent upon the percent of profit desired, and the amount the public schools are willing and able to pay.

Orders for films are usually placed well in advance, in many instances, as much as one year's lead time is necessary for filling exact date requests. However, most rental libraries can fill a large proportion of their orders using a two or three month lead time.

Delivery from a rental library is normally handled by the United States Mail, United Parcel Service, or in some instances, private trucking services. Maintenance is usually excellent -- the films must be kept in good condition to earn their keep.

Many private libraries are using electronic data processing techniques for filling, shipping and inventory procedures. Few, if any, are using a computer to book (schedule) films.*

The greater the circulation, the greater the operating budget of the private library. Most rental library directors plow a majority of the profits back into new acquisitions or multiple prints, and into more economical and more efficient operating procedures. The rental collection is, therefore, usually more accessible, efficient and has a better selection of titles than the local cooperative.

Regional Collections

Regional collections typified by the New York State BOCES have developed in the last decade. They have been established by local school boards in an attempt to obtain the quality, breadth and depth of the private library without having to pay seemingly high yearly rental charges. However, in most instances, they have been unable to acquire either depth or breadth in their titles. The economics of film purchasing practices have not permitted much beyond the basic collections necessary to serve the immediate needs of their region. It is difficult for a BOCES Media Director to justify to his supervisor the stocking of film titles that will only be circulated once or twice a year. However, a rental collection which serves a larger school population can easily afford such a "library".

The major advantage of a BOCES type collection is that it is accessible. Teachers need order only three months or less in advance because prints are stocked in great enough depth to satisfy a fair percentage of requests. Delivery can be made by school vehicles and adequate maintenance can be assured. In some BOCES, data processing techniques are utilized to facilitate record keeping, confirmations and delivery. Costs of BOCES libraries are borne by the member boards at a per-pupil-per-year rate determined by the boards. Most BOCES are staffed by a director, an administrative assistant and a clerk.

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* The United States Air Force Film Library, St. Louis, Missouri, processes its world wide, daily deliveries in a computer.

Ideally, the director of a BOCES center would be an educator who spends the majority of his time on instructional improvement tasks within his BOCES area. This is not always the case in New York State where the director is generally tied closely to his film library. The help of educational media specialists is needed in most of the schools of New York State. The BOCES arrangement could provide this help if its personnel could be freed from the mechanics of film acquisition, maintenance and distribution.

Regardless of the type of ownership and/or distribution system employed, the film usage problems encountered by teachers and media administrators are alike. They are: (1) delays in confirmation of orders, (2) duplication of film titles, (3) lack of standardization of ordering procedures, record keeping, coding and accessioning, (4) lack of standardization of maintenance, delivery and return procedures, (5) diverse booking periods and (6) the inability of the personnel in the Bureau of Educational Communications of the New York State Education Department to make any long range plans due to their inability to gather consistent statistical information.

Confirmation Delays

In all current film distribution systems, the process of ordering is slow and the feedback delayed. Teachers order films in several ways: (1) by direct mail, (2) through the school secretary or clerk, (3) by making a verbal request to the school principal or audiovisual coordinator, or (4) by filling out order forms and depositing them with the principal, the audiovisual coordinator or district director. In some few cases, they may phone in a given request.

Regardless of how the order is placed, the result of present booking and accounting procedures is usually a gap of from one week to several months between the time a teacher requests a film for a given show date and the time he receives condirmation of that request.

Duplication of Film Titles

Preliminary data from this study indicate that contiguous libraries are purchasing many titles in common. Within a given region, large school districts, BOCES libraries, and private collections may all own copies of the same film. In some instances, this duplication of collections seems justified. Some titles, for example, enjoy such heavy demand as to make their inclusion in any library advisable. In other instances, however, this duplication constitutes a definite waste. If properly utilized, one or two copies could satisfy the needs of the entire area. However, the necessary organization to enable such "proper utilization" does not now exist.

At present, large districts, cooperatives, BOCES and private film libraries purchase their titles and prints independently, without consultation or communication of any sort. Some form of coordinated purchase strategy could alleviate some of the title and print overlapping as well as presenting the possibility of mass or contract purchase and cooperative sharing of less well used titles between libraries.

Standardization - Business Procedures

Every library in New York State uses its own accessioning, coding, ordering and bookkeeping practices and patterns. Coding and accessioning of films is as diverse as the techniques available to the media directors. Library of Congress, Educational Film Library Association, Bertha Landers, Dewey Decimal, and simple numerical and alphabetical systems are in use. A common procedure would facilitate interchange and data transfer and quite probably reduce operational costs.

Maintenance and Delivery

Motion picture film properly maintained will withstand a considerable amount of use or number of screenings. Manufacturers estimate that a film should be able to be shown between 1,000 and 2,000 times before it must be replaced. Under normal BOCES operation, it might take ten years for the film to be screened 2,000 times. If the film is not kept in a storage can and housed in a facility with the proper humidity and temperature controls, if it is not rewound, inspected and cleaned on professional inspection equipment after every delivery, if it is not periodically sent to the laboratory for scratch and stain removal, it will not be able to last through even the 1,000 showing minimum established by the producer.

Most BOCES operations have been acquiring professional maintenance equipment but have not standardized on inspection and film renewal schedules.

Delivery and return of film procedures are equally diverse. Some systems use the United States Mail, others United Parcel or other commercial delivery services. Many BOCES purchase their own delivery vans or trucks, and still others take advantage of teachers or directors and their personal automobiles. Additionally, each library has established its own calendar for the delivery and return of films to the center. Some BOCES have a one week use period, others operate on a one, two or three day use time. Rental libraries provide any length use period desired by the client and must add to the use period transportation times to and from the client as well as any intervening holidays or weekends.

Standardization of booking periods, delivery and return dates and physical delivery practices could contribute further efficiencies to the film utilization in New York State.

Uniform Statistics

Records from all film libraries which receive state aid must be filed with the Bureau of Educational Communications, New York State Education Department. It takes close to one man-year to decipher the records submitted by the thirty plus institutions under obligation to the State. Uniform record keeping procedures would be invaluable for long range planning by the personnel in the State Education Department.

OBJECTIVES

The overall objective of this study was to determine the feasibility of providing teachers in all areas of New York State greater flexibility and efficiency in ordering, scheduling and utilizing instructional films. To investigate this general aim, the following sub-objectives were postulated:

A. To determine the feasibility of utilizing a central computerized booking, distribution and bookkeeping system for all educational film collections in the State of New York. Information and data were gathered from 14 BOCES libraries and the Syracuse University Film Rental Library (SUFRL). This data was analyzed in the Syracuse University IBM 7074 computer, utilizing programs designed specifically for this purpose. Patterns for standardized booking, distribution and bookkeeping were found to be essential for both input, output, and analysis of data.

B. To compare costs of electronic booking, confirming and accounting with present booking, confirming and accounting procedures now accomplished by clerks. Data was collected and alternate man-machine systems were developed providing systems choices for those having the power to make the necessary, administrative decisions.

C. To study the possible effects of coordinating the holdings of the 14 BOCES Film Library Cooperatives with one large rental film library. Computer programs were designed to simulate what would happen if the SUFRL were used as a backstop facility for the BOCES. Data was gathered on the number of films now booked through Syracuse University to BOCES areas and a BOCES teacher survey was completed to determine what films teachers in BOCES districts would order if they had the total offerings of the SUFRL at their disposal.

D. To investigate the feasibility of expanding the system to include 30 BOCES libraries in four years and 60 BOCES libraries in ten years. BOCES libraries are expanding so rapidly that the estimate of 30 in four years has almost been reached in one year.

The parameters of the simulation program have been designed to answer questions regarding the expansion capabilities of the present system within the recognized limitations of all simulations, i.e., a possibility of a fairly high probability of error in estimate.

E. To analyze cost accounting of the necessary equipment, personnel and increased usage records resulting from the use of a computerized system in combination with a large supporting library. Cost estimates were gathered from many industrial organizations. Comparative figures have been scrutinized to determine the various alternatives for actual operation.

CHAPTER II

METHOD

To answer the questions posed by the stated objectives, a plan-of-operation was designed. Since the project dealt primarily with information and its interpretation and reinterptretation under differing conditions and parameters, the following general strategies were employed:

1. The New York State Education Department, Bureau of Classroom Communication, was contactdd to identify all operating BOCES Film Libraries in the state. Fourteen libraries were located. (See Appendix A for a listing of the libraries by code number and director.) The department also provided all available information about statewide plans for BOCES or other regional educational service arrangements. Since the BOCES directors are required by state law to submit annual reports to the New York State Education Department, Bureau of Classroom Communication, the research team scrutinized these reports for whatever data seemed applicable.

2. The fourteen BOCES libraries were asked to submit the following data:

a. An alphabetical list of all their film titles. In many instances, the directors records were confused; identical films were found listed under as many as three different titles.

b. One year's complete booking records. These records included all requests for films within the BOCES area, even those requests that were refused. All the records obtained differed widely in format. The project staff spent an inordinate amount of time translating raw, unclassified data into uniformly codified input information.

c. Their operating budgets. Many BOCES directors were either unable to reluctant to disclose their financial records. This reluctance may have resulted from an unwillingness to share salary information, or because local superintendents or school boards would not permit the release of supposedly classified material. The New York State Education Department, Bureau of Classroom Communication, however, was able to furnish the project the financial data included in the BOCES annual reports for 1964-65. This information was used to "guesstimate" current expenditures.

d. The results of a stratified random sample of BOCES teachers who would select on an unlimited basis, films from the SU[illegible]RL catalog instead of the limited BOCES collections. The scope of the data collection and analysis involved made it advisable that not all 14 BOCES participate in this portion of the study. Rather, six BOCES were selected which were representative of the entire group. Under the direction of the project staff, each of these six BOCES selected a sample of 200 teachers from their service area. Stratified random sampling techniques were used so as to achieve proportional representation of teachers from among the categories 1) elementary, (2) mathematics, (3) science, (4) English, (5) social studies, and (6) other. Each BOCES director then prepared and distributed a questionnaire (See Chapter III) designed by the BOCES directors in a meeting at Kiamesha Lake in November of 1965. Catalogs, questionnaires and order forms were sent to each teacher.

e. An indication of the amount of time necessary to book and confirm a film for showing. This information was gathered in two ways. The first technique had each BOCES director write out his impression of his own film library operation without concern for factual data but rather a feel for how the system was working. Each director also described the booking and confirming procedures. Phase two was accomplished by visits to the separate BOCES libraries by the Research Associate, and at times, the Systems Programmer. During these observations, actual time studies were made and average times were computed.

f. A statement of their present and future plans. These statements had not been made available to the investigator at the time of the writing of the final report.

g. All available information about film utilization by title, print, number of showings and number of viewers per showing. Most of this information was gleaned from a detailed computer analysis of the BOCES book records; however, data on number of showings and number of viewers per showing is almost totally unavailable. Some of the directors assayed educated guesses that ranged from 1-20 showings per booking, and from 20 to 350 viewers per showing. These totals, when extrapolated to all prints of any given title are disconcerting and probably extremely inaccurate. No method for successfully gathering usage and viewing data has, as yet, been devised. The director of this study, therefore, abandoned any data gathering except the intuitive statements of the BOCES directors.

3. All film titles, plus duplicate prints from the 14 BOCES libraries and the SUFRL were inventoried by punching coded IBM cards for each title so that a magnetic tape master inventory could be compiled.

4. The SUFRL was envisioned as the backup library for the 14 BOCES collections included in the study. Shipping lead times to the various BOCES, as well as information on the school year calendar was gathered and carefully plotted. A computer program was designed which could establish this information in core memory for rapid access. Thus, when a request for a title was presented to the computer, it searched its memory and computed the number of lead days needed to get the film to the teacher on time. Computation could be on the basis of United States Mail (regular or special handling), United Parcel Service, or truck deliveries, whichever is desired.

5. Shipping and maintenance costs were gathered and calculated for the various delivery methods available within New York State.

6. An attempt was made to gather data on salaries and stipends paid to BOCES personnel. In many instances, this information was not made available to the researchers. Therefore, only rough estimates can be attempted.

7. Booking schedules were designed to simulate actual BOCES scheduling as it might be achieved under a computer-based film library system. The project's systems analyst wrote a complex operational simulation of the film library network using the SUFRL as the base library and the BOCES as autonomous but dependent units whose film inventories, booking patterns and school distribution schedules were controlled by a centralized processor (computer) based at Syracuse University. This program attempted to replicate an operational model conceived by the project staff which would, hopefully, be able to take greater advantage of the existing film collections in New York State. The program included such elements as inventories, lead times, calendars, delivery techniques, maintenance patterns involved in routine booking, as well as provisions for emergency requests involving immediate confirmation and shipment.

8. Programs were written to handle the routine tasks of computer printing of confirmations, shipping labels, invoices and financial statements. Peripheral data processing equipment was utilized for many of these details, recognizing the expansion of data processing equipment into almost all BOCES units in New York State.

9. All simulations were run through a variety of parameter changes. The first simulation was an attempt to imitate present SUFRL booking practices. The second run added the present BOCES surplus orders to the SUFRL program. The third simulation doubled the

number of SUFRL bookings, adding extra prints where needed according to an established level of probability. The fourth run doubled the number of BOCES orders spilling over the SUFRL with the resulting increase in BOCES libraries and SUFRL print acquisitions. Other variations were run to test the backup capabilities of SUFRL under varying conditions of load and delivery method.

CHAPTER III

RESULTS

This section of the report will document those data gathered that are relevant to the study's stated objectives. The METHOD section itemized a listing of data collected from (1) The State Education Department, (2) the Syracuse University Film Rental Library (SUFRL), (3) the Board of Cooperative Educational Services (BOCES), and (4) the BOCES administered teacher survey. Information relating to inventories will be presented first, followed by results of the teacher survey, usage data, and finally, the findings of the simulations.

INVENTORY DATA

Inventory data was collected from 14 BOCES, 2 State College Libraries and the SUFRL (See Appendix A for a list of the BOCES areas and Directors, Appendix B for the name of college libraries and their Directors).

The 14 BOCES libraries own 3,393 titles and 8,642 prints. The SUFRL has a collection of 4,122 titles and 7,730 prints. There were 1,370 titles (40.4% of their aggregate total), representing 2,350 prints, that were held by the BOCES libraries, but not by the SUFRL. All told, the 15 libraries held 16,372 prints of 5,492 titles. The inclusion of two State College libraries raised the grand total to 5,954 titles and 18,050 prints for the 17 libraries.

It is interesting to note that of the 5,492 film titles held by the original 15 libraries, only 338 were held in common by 10 of the 15 libraries, and that no titles were held in common by all 15 groups. The 3,393 titles held by the BOCES accumulated to a total of 7,674 titles when the same title was counted again each time it appeared in another library. On the average, any given title is held in 2.3 libraries. Roughly 50% of the titles found in any one BOCES library did not exist in any of the other 13 BOCES libraries.

Further examination of BOCES inventories was performed to determine the extent of multiple copy ownership. There were only 5 BOCES in which both booking records and print number indications were available. These 5 libraries held a combined total of 3,058 titles. Of those, 402 titles appeared as held in duplicate, (i.e. 2 copies in one library), 25 titles in triplicate, and a scant two titles had four prints each.

RESULTS OF THE TEACHER SURVEY

A survey of 1,200 teachers administered by the directors of 6 of the 14 BOCES adds another dimension to the results of this study. These data are particularly relevant to the findings on film usage. Of the 1,200 teachers surveyed, 617 (51.4%) returned usable responses. In the survey, each teacher was provided with a copy of the SUFRL catalog and with order forms. Explicit instructions were included asking the teacher to order all the titles he would use during the school year if he had the total resources of the SUFRL at his disposal.

The survey packet also included a brief questionnaire. The first four questions on that questionnaire sought demographic data on grade level, subject, years of teaching, and whether this was the first year for the teacher in his or her present school. The actual questions and a summary of the responses follow:

1) What grade do you teach? N = 601

183 K-3 30.4%

131 4-6 21.8%

100 7-9 16.6%

187 10-12 31.1%

2) What subject areas do you teach? N = 604

303 None 50.2%

55 Math 9.1%

50 Science 8.2%

45 English 7.5%

46 Social Studies 7.6%

105 Other, please specify 17.4%

3) How long have you been teaching, including this year? N = 605

28 1 year 4.6%

126 2 to 4 years 20.8%

131 5 to 9 years 21.7%

120 10 to 14 years 19.8%

95 15 to 20 years 15.7%

105 over 20 years 17.3%

4) Is this your first year at your present school and grade l evel? N = 603

82 Yes 13.6%

521 No 86.4%

The remainder of the survey results relate to usage patterns and utilization procedures. The results were:

5) If yes, did you cancel films ordered by the former teacher? N = 147

5 Yes

3.4% Cancelled Film

142 No

6) Have you ever ordered film from your BOCES film library? N = 588

240 Yes, I do so regularly 40.8%

143 Yes, but rather infrequently 24.3%

205 No, I never have 34.9%

A further breakdown of the BOCES users shows 56.2% ordered by Elementary teachers, 1.9% Math, 48% Science, 31% English, 48.9% Social Studies, and 14.4% for all other subjects.

7) Have you ever ordered film from other sources? N = 579

163 Yes, but from free sources only 28.2%

173 Yes, from both free and rental sources 29.9%

243 No 42.0%

8) How many films would you use in a typical teaching year? N = 582

138 0 to 4 23.7%

72 5 to 9 12.4%

73 10 to 14 12.5%

52 15 to 19 8.9%

51 20 to 29 8.8%

64 30 to 39 11.0%

36 40 to 49 6.2%

96 50 and over 16.5%

The average number of films per year used by all types of teachers was 17.8. These averages break down to 26.5 films for Elementary Teachers, 4.5 for Math, 20 films by Science teachers, 10 by English, Social Studies 16, and all others 9.5.

9) Under present conditions when you order a film do you generally: N = 589

104 order it for your own use only? 17.7%

232 order it with a prior understanding that it will also be available for other teachers to use. 39.4%

133 order it for yourself and some other specific teacher(s) only 22.6%

58 I never order films: the films I use are selected and ordered by (specify)________________________ 9.8%

62 None of these. Explain________________________ 10.5%

____

Under present conditions when you select a film and a use date for that film, do you generally: N = 539

10) 215 do so entirely by yourself? 39.9%

11) 227 do so in consultation with other teachers 42.1%

12) 76 do so in consultation with an A-V coordinator in your school or district 14.1%

13) 14 do so in consultation with a principal, clerk or other person in your school or district. 2.6%

14) 7 do so with the aid and counsel of BOCES personnel 1.3%

15) Under present conditions, do you place your orders directly with the BOCES film library, or do you route them through intermediaries? N = 512

69 directly to BOCES 13.5%

267 via an A-V coordinator 52.1%

46 via a principal 9.0%

74 via a school clerk or decretary 14.5%

56 other. Explain 10.9%

16) **Do you ever pick up the phone and place an order for films directly with the BOCES film library?** N = 581

45	**Yes**	7.7%
536	**No**	92.3%

17) **If yes, what percent of your total film orders would you say?** N = 50

26	**2% or less**	52.0%
12	**3 to 4%**	24.0%
3	**5 to 9%**	6.0%
1	**10 to 14%**	2.0%
2	**15 to 19%**	4.0%
0	**20 to 24%**	0.0%
4	**25 to 49%**	8.0%
2	**50% and over**	4.0%

18) **Teachers sometimes take their classes to other rooms to see a film. This may be a projection room, an auditorium, a cafeteria or even another classroom. Considering such viewing as "outside your classroom", what percent of the films your children see are viewed outside your classroom?** N = 55

312	**4% or less**	56.3%
28	**5 to 9%**	5.1%
16	**10 tp 19%**	2.9%
17	**20 to 29%**	3.1%
11	**30 to 39%**	2.0%
16	**40 to 49%**	2.9%
154	**50% and over**	27.8%

19) **Do you consider a two-day use period for a film adequate?** N = 574

271	**Yes**	47.2%
303	**No**	52.8%

20) If no, how many days would you prefer ? N = 324

77	3 days	23.8%
95	4 days	29.3%
126	5 days	38.9%
24	6 to 10 days	7.4%
2	more than 10 days	0.6%

21) Generally, how long in advance of the day you wish to show a film would you like to order it? N = 582

379	two to three weeks	65.1%
73	four to eight weeks	12.5%
49	quarterly	8.4%
35	once each semester	6.0%
46	once a year	7.9%

USAGE DATA

Detailed booking records were analyzed for 7 of the 14 BOCES and the SUFRL. These 7 BOCES libraries held 3,393 titles and 5,712 prints. There were 65,837 bookings recorded for these 5,712 prints for an average of 11.5 bookings per print. The SUFRL, on the other hand, had 49,467 bookings for its 7,730 prints, an average of 6.4 bookings per print.

In addition, analysis was made of the teacher's hypothetical film order gathered from the survey. The teachers ordered film from the SUFRL catalog which contained a selection of 3,645 titles. They ordered 22,837 films. Since deliveries were not made, the number of prints was, of course, immaterial.

Three groups of data resulted from these analyses: One for SUFRL, one for BOCES, and one for the Teacher's film orders. These data groups will be referred to as "S", "B", and "T", respectively, in all tables and graphs to follow.

In an attempt to examine usage patterns in greater detail, parameters were established for light, medium, and heavy usage of each print in a collection. Because the operations of a rental library and a BOCES collection differ, particularly in their proximity to their user, different parameters were used for the two types of libraries. Light usage was defined as less than six bookings per print per year for both types of collections. Medium usage was defined as from 6 to 11 bookings per print per year for the SUFRL and from 6 to 17 bookings per print per year for the BOCES. Heavy usage in the SUFRL was defined as exceeding 11 bookings and in the BOCES as exceeding 17 bookings per print per year. The teacher data was evaluated using the SUFRL parameters.

Early in the examination of the usage data, it was noticed that certain films were booked only during limited periods of the year. These are the so called "seasonal" films. Parameters were, therefore, established for identifying this type of film. If a film showed 90% of its bookings to have been within a five month period with a minimum of six bookings total, it was identified as a seasonal film. The parameters for seasonality (90% in 5 months) were held constant for all three groups of data.

Data was also gathered on film titles that had no usage, (no usage was defined statistically as an average of less than one booking per print), on titles that were new to a collection, and on those films that were returned late by the user. Data on late returns is important because the late return of a film causes readjustment of its schedule that sometimes eliminates one or more subsequent uses. This is true for both rental and BOCES libraries, but is much more damaging for rental services. The rental librarian usually cannot telephone the delinquent or retrieve the film himself as BOCES personnel can. Unfortunately, late returns and "new film" information were only available from the SUFRL.

The final set of parameters dealt with the film's booking status. Patterns were examined, based on whether the film was booked (1) on the actual request date, (2) within 7 days of the request date, (3) more than a week away from the request date, or (4) had to be refused because the film was completely obligated. Adequate refusal data, however, was available from only two BOCES and data on request dates from only three.

With the parameters thus established, it is now possible to look at the results of the particular portions of the analysis for the three groups of data. The first analysis to be covered will be that of usage levels by usage code designations.

Table 1 contains the number of films, prints, and bookings for each of the three data groups which fell into the various usage categories. In interpreting this data, compensation must be made for the relatively low total volume of bookings in the teachers film orders. This low volume has undoubtedly tended to accentuate the low usage end of the scale for that group. However, even with that compensating factor in mind, Table 1 reveals some startling differences.

Examination of the light, medium, and heavy usage sections of Table 1 shows that 29.6% of the BOCES titles were in the light usage category, as compared to 38.9% of the SUFRL and 62.6% of the teachers' data. The percentages for prints held were comparable--

TABLE 1

BOOKINGS BY TYPE OF USAGE

				LIGHT USAGE			NORMAL USAGE			HEAVY USAGE		
	B	S	T	B	S	T	B	S	T	B	S	T
Number of Films	3,393	4,122	3,645	1,004 (29.6)*	1,604 (38.9)	2,282 (62.6)	1,494 (44.0)	1,813 (44.0)	419 (11.5)	246 (7.3)	199 (4.8)	166 (3.2)
Number of Prints	8,642	7,726	6,491	2,490 (28.8)	2,654 (34.4)	4,852 (74.7)	4,807 (55.6)	4,184 (54.2)	888 (13.6)	385 (4.5)	346 (4.5)	207 (3.2)
Number of Bookings	65,837	49,507	22,837	8,983 (13.6)	9,910 (20.0)	12,381 (54.0)	48,238 (73.3)	34,887 (70.5)	6,297 (30.0)	8,560 (13.0)	4,692 (9.5)	3,238 (14.2)

B = BOCES

S = SUFRL

T = TEACHERS

	NO USAGE		NEW TITLES	LATE RETURN
	B	S	S	S
Number of Films	34 (0.4)	506 (12.2)	1,106 (26.8)	---
Number of Prints	96 (1.1)	542 (7.0)	1,273 (16.5)	---
Number of Bookings	55 (.08)	18 (.04)	4,487 (9.1)	127 (.3)

* The numbers in parentheses are the equivalent percentages for each cell.

28.8% BOCES, 34.4% SUFRL, and 74.7% teachers. It appears, therefore, that the BOCES tend to have substantially less light usage than does the SUFRL. The percentages for bookings confirm this suspicion. A smaller percentage of the BOCES total bookings (13.6%) are accounted for by titles falling into the light usage category than is true for SUFRL (20.0%)

It will be noticed that the teachers data shows an even higher percentage of light usage This may be due to the low overall volume of the teachers order, or to a high degree of selectivity in ordering. More will be said about this later.

The percentage of medium usage titles is the same for both the BOCES (44%) and the SUFRL (44%). In each case, this 44% of the titles accounted for approximately 70% of the total years bookings, a ratio of less than 2 to 1. For the teachers data, however, only 10% of the titles fell into the medium usage category, but that 10% accounted for a full 30% of the total bookings. Apparently, the teachers surveyed preferred to use fewer titles overall, but to use them more heavily.

The heavy usage patterns are quite similar for all three groups of data. The volume of teacher data was probably not high enough to allow any difference to show that may have been present.

Turning next to the seasonal usage data, an interesting difference appears. It seems that the rental library (SUFRL) caters to the seasonal desires of customers more than do the supposedly more flexible BOCES centers. Roughly, 16% of the titles are seasonal in both the BOCES and SUFRL. Yet, that 16% accounted for only 12.9% of the bookings in the BOCES, but for 16% of the bookings in the SUFRL. When one takes into account the increased turnaround time inherent in the U.S. Mail delivery used by SUFRL in contrast to truck deliveries used by the BOCES, it can be seen that the BOCES are handling considerably less "seasonal film" than the SUFRL. The teachers film order data, in contrast, had roughly as many seasonal titles (15.2%), but these titles accounted for a whopping 37% of all the film ordered.

The late returns column indicates that most teachers who deal with the SUFRL are quite faithful in returning prints on time. This display of consideration on the part of public school personnel is most encouraging, and hopefully is reflected in teacher behavior as members of a BOCES, although no evidence was submitted to the research team for analysis.

Table 2 deals with usage by day of the week for which they were booked. Some difficulty exists in interpreting this table since the data given on the booking record was, in all cases, the first day of use. For the BOCES, the first day of use was also the day of delivery. For SUFRL, however, the first day of use was the day of delivery only for bookings with a 5 day use period or longer. For

TABLE 2

BOOKINGS BY THE DAY OF THE WEEK

	BOCES N = 65,836	SUFRL N = 49,507	TEACHERS N = 22,837
SATURDAY	95 (9.1)	158 (0.3)	890 (3.8)
SUNDAY	85 (0.1)	29 (0.1)	863 (3.7)
MONDAY	24,637 (39.0)	23,242 (47.0)	6,250 (27.1)
TUESDAY	8,090 (12.0)	10,380 (20.8)	4,184 (18.0)
WEDNESDAY	19,366 (29.9)	7,698 (15.4)	4,791 (18.6)
THURSDAY	6,889 (10.3)	4,094 (8.0)	4,289 (18.1)
FRIDAY	6,674 (10.1)	3,906 (7.9)	1,570 (7.0)

* The numbers in parentheses are the equivalent percentages for each cell.

all bookings with less than 5 day use periods, the film was shipped to arrive at the school on the last regular school day immediately preceding the use day.

With this in mind, it must be concluded that Table 2 probably more accurately represent differences in delivery patterns than it does differences in days on which teachers wish to use film. From the figures given for the teachers data, it can be seen that teachers themselves are less selective about film usage by day of the week than are either SUFRL and BOCES. This is an indication of the way in which film library operating procedures can, and sometimes do, dictate to teachers the way in which they will use film.

Figure 1 and Table 3 present the data on number of bookings for each month of the school year for the three groups. The reader will be struck by the high degree of similarity among the three groups. The major difference appears to be that the teachers want a higher volume of film early in the year than has been characteristic of the usage of the BOCES or SUFRL. One may suspect that it has been limited availability that has prevented the teachers desires from being reflected in the actual usage patterns.

Finally, for a more detailed analysis of the data of total volume usage by calendar period, Table 4 was prepared. That table presents the usage figures for each group by week of the year. The decreases in usage during the 12th, 17th, and 33rd. weeks respectively are indicative of the Thanksgiving, Christmas, and Easter vacations, in that order. The teacher data places Easter somewhat sooner, of course, since in the year for which teachers place their order (1966-1967) Easter will come earlier than it did in the year of the actual booking records (1964-65).

Analysis was also made to determine whether there were any key weeks when teachers tended to want films more than these. Table 4 reveals the randomness of the high and low weeks except for the beginning, holidays, and end of the school year. 26% of the weeks were even as far as percentage of bookings are concerned. Some 19.6% of the weeks showed a gap of 1% between high and low percentage. All other percentages are relatively meaningless. The teachers survey data does confirm their desire for more films early in the school year but it also indicates a continued interest in receiving films late in the school year as contrasted with the sharp dropoff in BOCES and SUFRL bookings.

Both the BOCES and the SUFRL record 15 weeks (35%) have a booking percentage of 3% or over of total film bookings, while the teachers desires seem to spread their requests more evenly over the entire booking period.

FIGURE 1

LINE GRAPH OF DATA OF
BOOKINGS BY MONTH

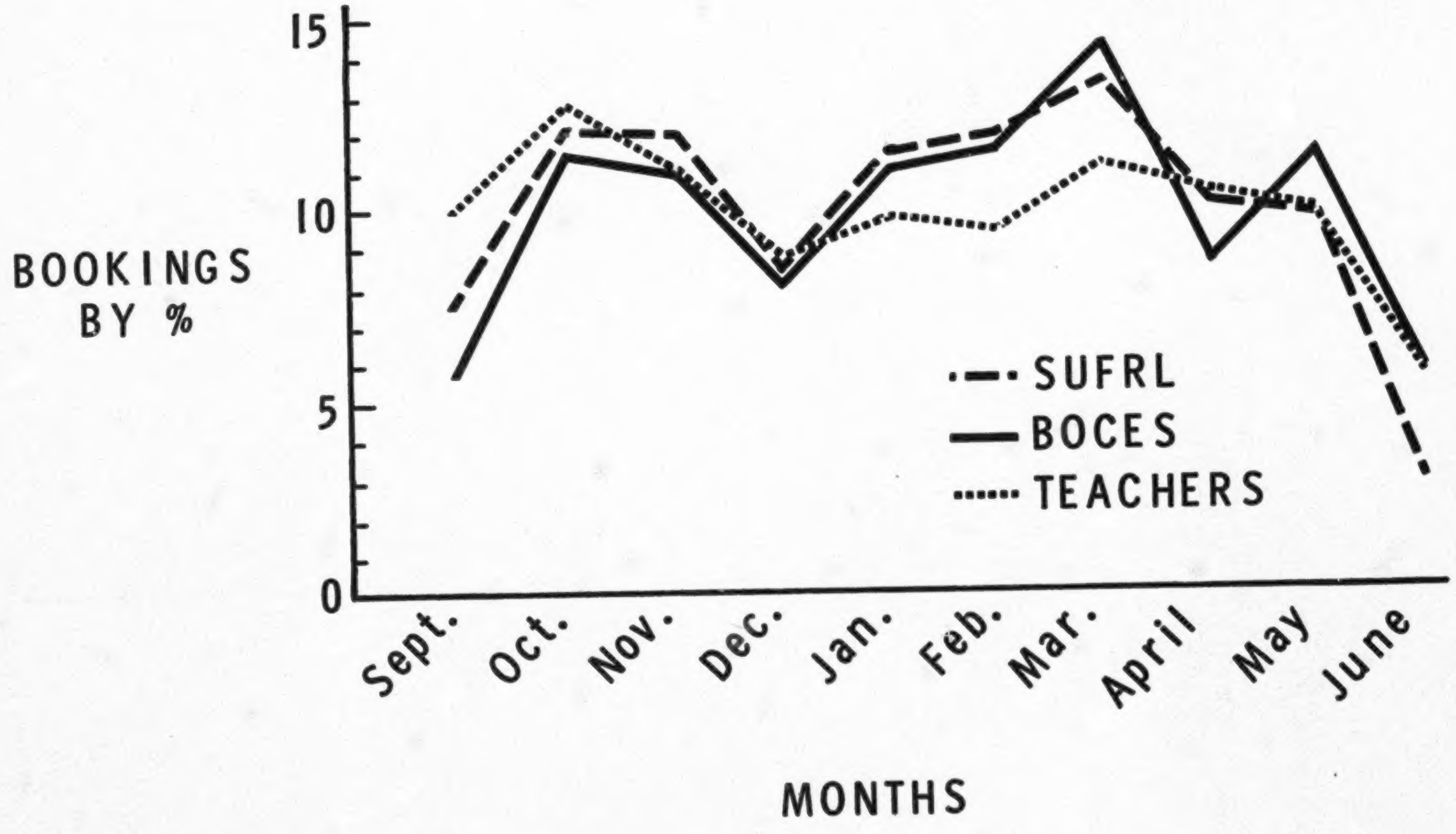

TABLE 3

BOOKINGS BY THE MONTH

LIBRARY	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MARCH	APRIL	MAY	JUNE
SUFRL	3,745 (7.6)	6,106 (12.3)	5,934 (12.0)	4,237 (8.6)	5,758 (11.6)	5,936 (12.0)	6,647 (13.4)	4,921 (10.0)	4,800 (9.7)	1,423 (2.9)
BOCES	3,866 (5.9)	7,731 (11.7)	7,305 (11.1)	5,343 (8.1)	7,404 (11.2)	7,565 (11.5)	9,393 (14.3)	5,555 (8.4)	7,781 (11.8)	3,983 (5.9)
TEACHERS	2,333 (10.2)	3,064 (13.4)	2,519 (11.0)	2,017 (8.8)	2,241 (9.8)	2,136 (9.4)	2,571 (11.3)	2,373 (10.4)	2,284 (10.0)	1,301 (5.7)

* The numbers in parentheses are the equivalent percentages for each cell.

TABLE 4

WEEKS	BOCES	%	SUFRL	%	TEACHERS	%	KEY
1	284	.4	327	.6	137	.5	
2	705	1.1	1,256	2.5	827	3.6	
3	1,489	2.2	1,243	2.5	803	3.5	
4	1,731	2.6	1,191	2.4	772	3.4	
5	1,977	3.0	1,653	3.3	812	3.6	
6	1,394	2.1	1,294	2.6	655	2.8	
7	2,132	3.2	1,502	3.2	700	3.1	
8	1,884	2.8	1,293	2.6	680	3.0	
9	1,925	3.0	1,550	3.1	661	2.9	
10	1,876	2.8	1,518	3.0	631	2.8	
11	1,946	3.0	1,830	3.7	642	2.8	
12	774	1.0	471	.9	438	1.8	
13	1,920	3.0	1,299	2.6	560	2.3	
14	2,018	3.1	1,763	3.5	611	2.7	
15	1,874	2.7	1,537	3.1	626	2.8	
16	312	.4	192	.4	366	1.6	
17	6	.0	22	.0	14	.0	
18	1,836	2.6	1,814	3.7	517	2.2	
19	1,968	3.0	1,652	3.3	699	2.9	
20	1,904	2.9	1,188	2.4	625	2.8	
21	1,696	2.5	1,086	2.2	429	1.8	
22	1,904	2.9	1,583	3.2	471	1.8	
23	1,961	3.0	1,438	2.9	666	2.9	
24	2,031	3.1	1,725	3.5	550	3.3	
25	1,665	2.5	1,199	2.4	451	1.8	
26	2,054	3.2	1,549	3.1	606	2.7	
27	2,009	3.1	1,511	3.1	672	2.9	
28	1,938	3.0	1,514	3.1	712	3.1	
29	1,894	2.8	1,345	2.7	480	2.0	
30	1,918	2.9	939	1.9	156	.5	
31	2,162	3.3	1,848	3.7	662	2.9	
32	1,267	2.0	936	1.9	546	2.3	
33	29	.0	220	.4	589	2.4	
34	1,681	2.5	1,706	3.4	536	2.3	
35	2,055	3.1	1,317	2.7	610	2.7	
36	1,969	3.0	1,249	2.5	573	2.4	
37	1,873	2.8	1,154	2.3	520	2.3	
38	1,815	2.6	978	2.0	464	1.9	
39	1,547	2.3	657	1.3	367	1.6	
40	1,467	2.2	642	1.3	421	1.8	
41	860	1.1	197	.4	385	1.7	
42	88	.0	29	.0	244	1.0	
TOTALS	65,836		49,507		22,836		

SIMULATION

The simulation program was designed to use either live data as input, or to generate its own input utilizing density functions obtained by the data analysis runs. The former type of simulation run will be called a "live data simulation." The latter type will be called a "generated data simulation."

Live Data Simulation

In the live data simulation, primary interest was directed toward determining the extent to which SUFRL could have served as an effective back-up library to the BOCES during the school year 1964-65. To determine this, information was needed on specific film requests that needed backstopping in the BOCES during that year. Unfortunately, only two of the BOCES had maintained refusal records. Between them they had a totalof 2,910 refusals. In addition, one BOCES had kept records of the "first choice" data for bookings filled on alternate dates. There were 2,420 of these "first choice" refusals. Working upon the assumption that both actual refusals and such "first choice" refusals constitute unmet needs, the two types were pooled for input to a live simulation run. This gave a total of 5,330 requests that could be said to have been in need of backstopping during 1964-65.

Those 5,330 requests covered 594 titles. Of those titles, 41 414 existed in SUFRL and were thus in a position to have been backstopped. There were 3,889 requests for the 414 titles, and of that number 27% could have been supplied on the exact day requested using the standard mail delivery typical of SUFRL. An additional 10% could have been furnished for use within 7 days of request. Had a two day delivery system been available, a full 73% could have been provided on the exact day. This indicates, to some extent at least, the relationship that exists between delivery system and number of exact day bookings. The more money a library system is willing to put into a fast delivery system, the more exact day bookings it can fill.

It was felt that, in addition to the above described live data simulation, other runs were needed in which the data base of unfulfilled requests which would be larger. No additional refusal information was available, however, so it was decided to use the teacher survey film orders as input. This data was pooled with the actual refusals (not "first choice" refusals) and used as input for a live simulation run. This gave a total of 25,179 requests. Table 5 indicates how well SUFRL was able to backstop those additional requests.

In the simulation run reported in Table 5, as in all simulation runs for this study, an attempt was made first to book the request on the exact day. If this was not possible, the computer then attempted to book the film on an alternate date not to exceed a specific (but variable) maximum range from the request date. For all runs in this study that maximum range was set at 30 days. If the computer succeeded in booking the film within the 30 day range of the request date, the film was obligated and the booking tabulated as

"1 WK" if it had been within 9 days* of the request day, and "M1 WK" if it fell from 10 to 30 days away from the request day. Thus the columns in Table 5 can be seen to contain the number of bookings falling in each of the ranges "EXACT", "1 WK" , and "M 1 WK."

In addition, since this study was to deal primarily with New York State, it was felt desirable to have the computer simulate the condition of having SUFRL discontinue its out-of-state rental business. The rows in Table 5 correspond to these conditions. In the first row the simulation was run without deleting any of SUFRL's 1964-65 actual bookings. The second row in Table 5 shows the results obtained when all out-of-state bookings for 1964-65 were deleted from the SUFRL records before the backstop function was simulated. A total of 5,277 out-of-state bookings were deleted.

TABLE 5

LIVE DATA SIMULATION

BACKUP ABILITY (U.S. MAIL)

NUMBER OF SUFRL BOOKINGS DROPPED	EXACT	1 WK	M 1 WK
NONE	8,890 (35.3%)	2,495 (9.9%)	3,908 (15.5%)
OUT-OF-STATE (5,277)	10,199 (40.5%)	2,536 (10.1%)	3,732 (14.8%)

In addition to booking film on either the exact day requested or on an alternate date, and of simulation various conditions of restricted usage for the SUFRL, the simulation program is also capable of simulating conditions under four different types of delivery system. These four delivery systems are:

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*A range of 9 days rather than 7 was used for the one week range because of the generous way in which SUFRL computes its arrival days for film delivery. If a teacher orders a film for Monday use, she receives it on the preceding Friday, etc. This 9 day week undoubtedly exaggerated the 1 week bookings slightly. However, it was held constant for all runs and should not, therefore, have invalidated inter-run comparisons. Also, both the 9 day and the 30 day ranges are alterable at will by the operator via the change of appropriate digits in a control card.

1) U.S. Mail, fourth class film rates (2 to 7 days delivery anywhere in N.Y.S.)

2) Special Handling, U.S. Mail (2 to 4 days delivery anywhere in N.Y.S.)

3) Commercial Delivery Service (fixed 3 day delivery anywhere in N.Y.S.)

4) Library Owned Truck Delivery (fixed 2 day delivery anywhere in N.Y.S.)

For purposes of discussion the four delivery types listed above will be termed Regular Mail, Special Handling, Commercial Delivery, and Truck, in that order.

Table 6 contains information from the same live simulation pass as does Table 5, but deals with exact day bookings only.

The columns are used for the various types of delivery services. Here the effect of shortened delivery time on exact day bookings again becomes apparent. The failure to gain an equivalent number of exact day bookings for out-of-state bookings dropped is probably due to the limited volume of requests.

TABLE 6

LIVE DATA SIMULATION

EXACT DAY BACKUP ABILITY

LIVE SIMULATIONS, 25,179 BOOKINGS BACKSTOPPED BY SUFRL

NUMBER OF SUFRL BOOKINGS DROPPED	REG MAIL	SPEC HAND	COMM DEL	TRUCK
NONE	8,890 (35.3%)	9,869 (39.3%)	10,818 (43.0%)	12,736 (50.6%)
OUT-OF-STATE	10,199 (40.5%)	11,242 (44.6%)	12,223 (48.5%)	13,721 (54.5%)

Generated Simulations

The format of the tables used for reporting the results of the generated data simulation runs will be very similar to that used in the above tables. Before beginning the presentations, however, a few words are in order regarding the functioning of the generated data simulations.

It will be recalled that during the analysis of the usage records for the three groups (SUFRL, BOCES and Teachers) three pieces of information were retained for each film. The first of these was the number of prints held, the second was the total volume of usage for that title, and the third was the density function indicative of the distribution of that film's usage across the weeks of the school year. An indication was also retained, of course, of whether or not the film was seasonal.

With this data it was possible to generate additional input at any level of total usage desired, and to have that generated data conform to the distributions of the original data for each title. For example, if it was decided to generate a run at twice the 1964-65 volume for the SUFRL, the computer could be fed the density functions for SUFRL and be given the exact volume of generated data desired.* The computer would then go title by title through the SUFRL films and generate for each film twice its 1964-65 usage. If the title under consideration was a seasonal film, that usage would be generated over the films individual distribution. If a title was not seasonal, the distribution of the usage would be generated along the curve representative of the aggregate usage for all SUFRL non-seasonal films.

For all generated data simulation runs the 1964-65 actual booking records of the SUFRL were deleted from the computer. In addition, the computer was instructed that it was to begin booking the generated requests against the 4,122 titles and 7,726 prints held by SUFRL, but that it was to add new prints as needed. The parameters for adding new prints were:

1) If the title was seasonal, add a new print for every 9 unbooked requests.

2) If the title was not seasonal, add a new print for every 10 unbooked requests.

These print adding parameters were variable and latter runs were made at different parameter levels. However, for Table 7 all the parameters remained as given above.

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*In this case 100 thousand would probably be used as a convenient double of the SUFRL actual usage of 49,507. There is no reason, however, why the exact 99,014 could not be used instead. If 100 thousand was used the computer would not exactly double each film usage, but would multiply it by 2.0199 (100,000/49,507). The rounding inherent in multiplying by a number such as 2.0199 explains the discrepancy between number of bookings requested and number of bookings generated in Tables 8-11.

The first generated data simulation to be run was at the exact volume of the SUFRL for 1964-65. The results of that simulation are presented in Table 7

TABLE 7

SUFRL SIMULATION

(49,507 Bookings)

Nmbr Bkngs Generated
47,951

Nmbr Prnts 7,726
Bkngs per print 6.2

BKNGS	EXACT	1 WK	M 1 WK	TOTAL	N BKD
49,507	41,357 (83.5%)	2,729 (5.5%)	3,865 (7.8%)	47,951 (96.9%)	1,556 (3.1%)

A comparison of this SUFRL simulation run with the actual booking data for SUFRL for the year 1964-65 indicated that the data generation routines of the simulation run were able to accurately reproduce the distribution found in the actual data. Four additional generated data simulation runs were then made all using the SUFRL density functions. The results of those runs are presented in Tables 8, 9, 10, and 11.

The first of these runs presented in Table 8 was a 66,000 booking run simulating a network of 14 BOCES libraries. 66,000 bookings were simulated as coming to SUFRL to be backstopped from those 14 BOCES. The 14 BOCES were assigned shipping lead times and individual volumes roughly along patterns representative of the 14 BOCES cooperating in this study.

The next generated data simulation hypothesized conditions of twice the volume of usage used in the second run. In the third run 132,000 requests were generated for the 14 BOCES. The results of that run appear in Table 9.

The final two generated data simulations of this phase increased the total volume of requests even further. The fourth run generated 200,000 requests distributed among 30 BOCES. The fifth run looked toward the possible consolidation of BOCES as had been suggested under proposed "Access Center" legislation in New York State. It hypothesized a volume of 400,000 requests from 20 such regional centers. The results of these two runs are to be seen in Tables 10 and 11 respectively.

It is interesting to note that in the last of these simulations the computer attempted to book 401,112 requests under four different delivery systems. Since each delivery system constituted

TABLE 8
GENERATED DATA SIMULATION
(66,000, 14 BOCES)

Nmbr Bkngs Generated
64,556

Number Prints 7,879
Bkngs per Print 7.7

	EXACT	1 WK	M 1 WK	TOTAL	NT BKD
REGULAR MAIL	50,824 (78.7)	3,878 (6.0)	6,125 (9.5)	60,827 (94.2)	3,729 (5.8)
SPECIAL HANDLING	53,238 (82.5)	3,939 (6.1)	5,296 (8.2)	62,473 (96.8)	2,083 (3.2)
COMM. DELIVERY	54,321 (84.1)	3,740 (5.8)	4,750 (7.4)	62,811 (97.3)	1,745 (2.7)
TRUCK	55,963 (86.7)	4,994 (7.7)	2,953 (4.6)	63,910 (99.0)	646 (1.0)

TABLE 9
GENERATED DATA SIMULATION
(132,000, 14 BOCES)

Nmbr Bkngs Generated
133,861

Number Prints 12,775
Bkngs per Print 9.9

	EXACT	1 WK	M 1 WK	TOTAL	NT BKD
REGULAR MAIL	109,885 (82.1)	6,231 (4.6)	10,281 (7.7)	126,397 (94.4)	7,464 (5.6)
SPECIAL HANDLING	114,753 (85.7)	4,618 (3.4)	9,321 (7.0)	128,692 (96.1)	5,169 (3.9)
COMM. DELIVERY	115,897 (86.6)	4,473 (3.3)	8,665 (6.5)	129,035 (96.4)	4,826 (3.6)
TRUCK	119,453 (89.2)	3,974 (3.0)	7,225 (5.4)	130,652 (97.6)	3,209 (2.4)

* Numbers in parentheses are equivalent percentages for each cell.

TABLE 10
GENERATED DATA SIMULATION
(200,000, 30 BOCES)

Nmbr Bkngs Generated
198,028

Number Prints 18,943
Bkngs per Print 10.0

	EXACT	1 WK	M 1 WK	TOTAL	NT BKD
REGULAR MAIL	169,654 (85.7)*	7,108 (3.6)	12,442 (6.3)	189,204 (95.5)	8,824 (4.5)
SPECIAL HANDLING	176,661 (89.2)	5,225 (2.6)	10,699 (5.4)	192,585 (97.2)	5,443 (2.7)
COMM. DELIVERY	179,403 (90.6)	5,085 (2.6)	9,049 (4.6)	193,537 (97.8)	4,491 (2.3)
TRUCK	183,743 (92.8)	4,303 (2.2)	7,177 (3.6)	195,223 (98.6)	2,805 (1.4)

TABLE 11
GENERATED DATA SIMULATION
(400,000, 20 REGIONAL CENTERS)

Nmbr Bkngs Generated
401,112

Number Prints 38,298
Bkngs per Print 10.2

	EXACT	1 WK	M 1 WK	TOTAL	NT BKD
REGULAR MAIL	367,593 (91.6)	9,096 (2.3)	14,719 (3.7)	391,408 (97.6)	9,704 (2.4)
SPECIAL HANDLING	376,876 (94.0)	6,608 (1.6)	12,097 (3.0)	395,581 (98.4)	5,531 (1.4)
COMM. DELIVERY	379,739 (94.7)	6,994 (1.7)	10,146 (2.5)	396,879 (98.9)	4,233 (1.1)
TRUCK	384,442 (95.8)	6,349 (1.6)	7,582 (1.9)	398,373 (99.3)	2,739 (0.7)

* Numbers in parentheses are equivalent percentages for each cell.

a new run on the 401,112 bookings the computer actually handled 1,604,448 requests: more than a million and a half. The total computer running time for that simulation was 1 hour and 31 minutes. The booking subroutine in the simulation run is, obviously, an extremely fast routine.*

Beyond that observation, not a great deal can be said about the simulation runs that is not obvious from the tables. The efficiency of high volume usage can be seen in the gradual increase in bookings per print from table to table. In a like manner, the benefits derived from faster delivery service is readily apparent.

Many additional simulation runs were also run. In some the print adding parameters were changed. In others the density functions from BOCES or teachers film order data were employed. It would seem sufficient to mention only two more here. These were runs designed to determine the differences between the SUFRL density functions and the teachers order density function when used as input for the simulation runs.

Two runs were made to test this difference. First, a run of 132,000 bookings on 14 BOCES was made for the SUFRL density functions. Next, an identical 132,000 booking run was produced using the teachers order density functions. For both these runs the print adding parameters were changed to 13 for seasonal films, and 14 for non-seasonal films. The results of these runs are reported in Tables 12 and 13 respectively. For an indication of the difference introduced by the change in print adding parameter Table 12 may be compared to Table 9.

In Tables 12 and 13 the extent of difference between SUFRL distribution and the teachers film order distribution can be seen. It will be noticed that when the SUFRL density functions were used the total number of prints required was 9,908. Using the teachers density function, however, 11,622 prints were required. This represents approximately 15% more prints under the teachers density function. Yet, even with that greater number of prints, a lower percentage was filled under all delivery conditions. Obviously, the teachers film order distribution represent a considerably more difficult distribution with which to cope than does the existing distribution of the SUFRL.

Additional implications of these data will be taken up in the next chapter.

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*It is not to be assumed, however, that in actual operation 1.6 million bookings could be processed in an hour and a half. In the simulation the total yearly volume for each film was known as input time, and each title had to be accessed only 4 times (once per delivery system). In actual operation, however, each title would generally have to be accessed anew for each booking.

TABLE 12
GENERATED DATA SIMULATION
(132,000,SUFRL DENSITY, HI PRINT PARA)

Nmbr Bkngs Generated
133,861

Number Prints 9,908
Bkngs per Print 11.5

	EXACT	1 WK	M 1 WK	TOTAL	NT BKD
REGULAR MAIL	94,243 (70.4)	6,048 (4.5)	13,880 (10.0)	114,171 (85.3)	19,690 (14.7)
SPECIAL HANDLING	100,776 (75.3)	6,571 (8.0)	13,838 (10.3)	121,185 (90.5)	12,676 (9.5)
COMM. DELIVERY	102,480 (76.6)	6,094 (4.6)	13,074 (9.8)	121,648 (90.9)	12,213 (9.1)
TRUCK	108,094 (80.8)	10,222 (7.6)	10,180 (7.6)	128,496 (96.0)	5,365 (4.0)

TABLE 13
GENERATED DATA SIMULATION
(132,000, TCHR DENSITY, HI PRINT PARA)

Nmbr Bkngs Generated
133,495

Number Prints 11,622
Bkngs per Print 9.4

	EXACT	1 WK	M 1WK	TOTAL	NT BKD
REGULAR MAIL	90,800 (68.0)	5,179 (3.9)	14,398 (10.8)	110,377 (82.7)	23,118 (17.3)
SPECIAL HANDLING	95.176 (71.3)	5,753 (4.3)	14,690 (11.0)	115,619 (86.6)	17,876 (13.4)
COMM. DELIVERY	96,253 (72.1)	5,828 (414)	13,787 (10.3)	115,868 (86.8)	17,627 (13.2)
TRUCK	102,595 (76.9)	8,094 (6.1)	12,083 (9.1)	122,772 (92.0)	10,723 (8.0)

* Numbers in parentheses are equivalent percentages for each cell.

CHAPTER IV

DISCUSSION

This chapter will utilize the data presented in the preceding chapter to determine possible answers to the questions raised in the original project proposal. That proposal listed among its objectives:

1) The determining of the feasibility of utilizing a central computerized booking, distribution, and bookeeping system for all educational organizations in the State of New York.

2) A comparison of the costs of electronic booking, confirming, and accounting with present booking, confirming, and accounting procedures now accomplished by clerks.

3) The studying of the possible effect of coordinating the holdings of the present 14 BOCES Film Library cooperatives with one large rental film library.

4) The investigation of the feasibility of expanding the system to include 30 BOCES libraries in four years and 60 BOCES libraries in ten years.

The following discussion of findings relative to these objectives will be presented in the same order as were the results in the preceding chapter. First will come the inventory findings, then the findings from the teachers survey, next the usage data findings, and finally, the findings of the simulation runs.

INVENTORY FINDINGS

The inventories held by the 14 BOCES provided a considerable surprise to the researchers. Whereas it had been anticipated that most BOCES would tend to stock the same titles, the opposite was found to be the case. As has been indicated, 50% of the titles in each BOCES collection were found to be unique to that collection. The BOCES pattern was that of a relatively small, limited title collection, providing a basic library of educational films to teachers. Little similarity existed among collections nor were most collections found to include many second or third copies. Very few titles were popular enough to be found in at least half of the BOCES libraries studied. The great increase in titles from which teachers could choose, if libraries agreed to share collections, is readily apparent.

While the inventories of the SUFRL and the two State University College Libraries were added to the BOCES the proportion of unique titles decreased somewhat, but it was still apparent that libraries vary greatly in the titles they hold. It appears, however, from a study of all the titles available in the state, and a comparison of that information with usage data and the results of the teachers survey, that a selection from approximately 6,000 titles would be adequate to meet most of the needs of the majority of teachers.

Presently the need for greater title variety beyond the limited selection available from local BOCES is met either by use of free films from government or industry, or by rentals from various rental collections. No evidence was found of any regular sharing among BOCES. The need for such sharing, or for some alternate approach to increase the utilization of existing film resources cannot be denied

TEACHERS SURVEY FINDINGS

The results of the teachers survey can be stated very quickly. Basically they are that teachers want to use more film than they now are able to use, and that they would like to be able to order that film much closer to the day of use. The average teacher uses about 18 films a year but would like to use approximately 35. The present lead time in ordering film varies from three months to a year, but the average teacher would prefer that it was about three weeks.

In addition, a strong negative correlation was found between the grade a teacher taught and the number of films he used. This negative correlation is probably due in part to the tendency for lower grade level films to be shorter in running time but more numerous in quantity.

No correlation was found between the number of years a teacher had been teaching and the number of films he used. This finding speaks well for the inservice training activities carried on by the BOCES film library personnel. Undoubtedly, more remains to be done along these lines, however.

USAGE FINDINGS

The film usage findings (Tables 1,2,3,4, and 5) reveal patterns that are probably typical of film libraries throughout the United States. It seems apparent that basic inventory logistics operate in these libraries. The film library directors face the problem of distribution with an inventory of titles and prints on one side of the ledger and requests from teachers on the other. They realize that film is expensive, that their inventories represent a substantial public or private investment, and that they have an obligation to garner the greatest possible return on that investment. It is quite natural, therefore, for directors to establish policies which will allow them to obtain the greatest per print distribution possible for their films. Films will be booked over as broad a period as possible at the inconvenience of teachers. In most school systems this policy has caused teachers to alter their sequence of subject matter presentation to conform with film availability, rather than either the dictates of the state syllabus or their own teaching logic.

The results of the teacher survey indicate that the film libraries ultimate client would like to establish a different pattern of film usage than presently exists. Figure 2 illustrates distribution patterns of the BOCES and SUFRL for Light, Medium, and Heavy usage film. The teachers curve superimposed upon the other two differs widely from them and indicates a strong imbalance between the teachers desires and the service they actually receive.

Two patterns of teacher behavior seem obvious from the data surveyed. They are:

1. Teachers use film seasonally. This seasonality is not confined to the obvious titles such as "AUTUMN ON THE FARM" but extends into all areas of the curriculum. Some of the seasonality appears to be due to syllabus or textbook progression, some by the logical subject order, and the rest by causes as yet unidentified.
2. Given the ability to order freely from an extensive listing of film titles, teachers tend to be selective and imaginative in their use of film.

Teachers tend to follow the syllabus or logical subject order in their teaching but, at the same time, they exhibit an encouraging amount of imagination and creativity in the restructuring of their subject matter. Thus, they individually provide for their students need for enrichment and depth.

FINDINGS OF THE SIMULATIONS

The findings of the various simulation runs serve basically as further support for the observations already made. It is apparent from these simulations that teachers wish to use film in a manner considerably different from the way in which they are now able to use it. In addition, the simulations indicate that great benefit could be derived from the linking together of libraries so that backstop services could be performed.

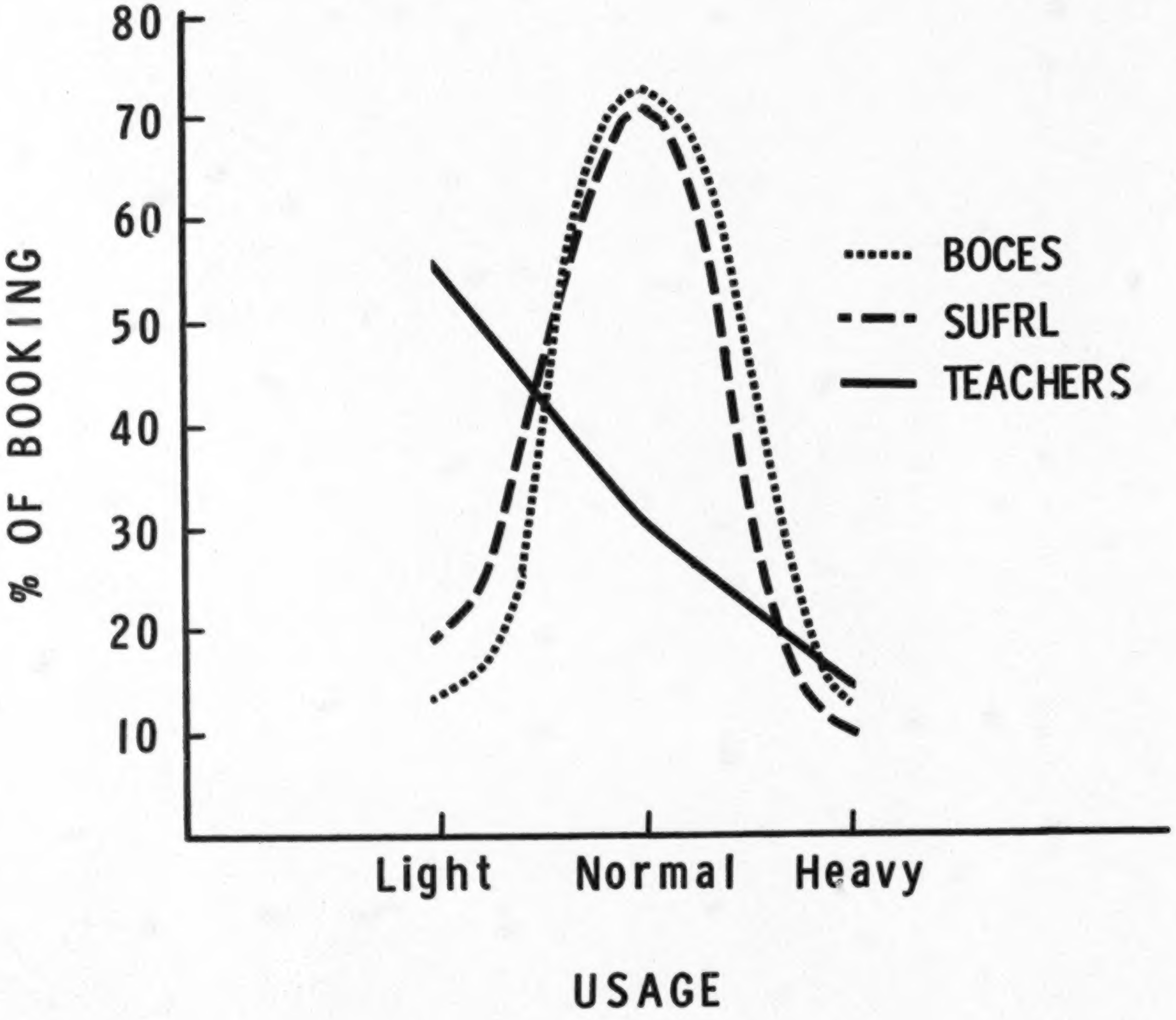
The successful execution of the simulation runs, however, prove one other point. That point is that the clerical work involved in film booking and inventory control can be automated. The proving of that point, along with the completion of the successful subroutines for data generation and film booking, is undoubtedly the major contribution of this entire study.

The stated objectives of this study can now be answered.

A. Is it feasible to utilize a central computerized film booking distribution and bookeeping system for all educational organizations in the State of New York?

FIGURE 2

BOOKINGS BY TYPE OF USAGE



The results of this study, both in the data collected and in the simulations, indicate quite clearly that computerized booking, distribution, and bookeeping are both feasible and practical. Powerful computer programs have been written, tested, and debugged to perform the functions of inventory control, booking, statistical analysis and simulation for film libraries. A complete listing of these programs is provided with the original copy of this report. A title and function list can be found in Appendix C.

Data on library holdings and usage has never been gathered or analyzed in the depth now possible because of these powerful computer based tools. Predictions for future film library expansion are now possible with a greater degree of accuracy than before because of the analytic and predictive abilities of these tools. It is now possible for the Bureau of Classroom Communications of the Division of the Education Communications, State Education Department of New York to begin preparing for state contract purchase of certain films that appear to belong in every BOCES and city film library. Beyond this, it is now possible to direct this purchase and placement of less popular titles so as to achieve the greatest degree of utilization from each print purchased.

B. Are costs of electronic booking, confirming, and accounting similar to or different from present booking, confirming, and accounting procedures now accomplished by film library directors and their clerks?

The first simulation run booked some 116,000 transactions in 18 minutes of computer time. At the typical rate of $5.00 a minute for computer time, 18 minutes of computation would cost $90.00. This is not to say that in actual operation 116,000 bookings would take only 18 minutes of machine time. But it is indicative of the fact that the cost for computer booking for all film in New York State would be considerably less expensive than the combined salaries of the numerous film library clerks now requires. The cost of programming, maintenance, and operation of any automated system, however, are high. It is far better to speak of the additional service possible than to attempt to count the dollar savings.

A computerized system for the State of New York, once it was beyond the initial cost period of programming and installation, could provide the schools of New York with greatly improved film service, and do that at little or no increase in overall costs. It would be hoped, however, that such a system would be supported with whatever funds were necessary to tailor the film collection of the state to best utilize the capabilities of the system.

The operating costs of such a system would be less than many people would tend to expect. For example, a wide area telephone (WATS) line to connect all of the libraries in New York State would cost only about $8,000 a year. An input terminal for each library would cost approximately $1,000 per year per library. No additional staff would

No additional staff would be needed at the BOCES level to operate such a system. In addition, existing professional staff could be relieved of much of their present clerical responsibility and allowed to carry on their proper professional activities.

C. What are the possible effects of coordinating the holdings of the 14 BOCES film libraries included in this study with the SUFRL?

The simulations have shown clearly that the SUFRL representing a major film collection, can be an effective backstop library for the BOCES in this study. At present, the SUFRL has a service area which covers the entire Northeastern part of the U.S. If the SUFRL confined its bookings to New York State alone, it could come very close to completely backing up the 14 BOCES. If it were to drop all other bookings within and without New York State, it could perform an even greater backup service. The simulations indicate that the SUFRL could maintain a significant backstopping function for the entire state if it became part of a state system. If its holdings were expanded in proportion to the expansion of the network, or if other backup collections were formed as usage levels increased, backup services could be provided to every teacher and school child in the state.

D. What is the feasibility of expanding the system to include 30 BOCES libraries in four years and 60 in ten years?[1]

The simulations indicate that the computerized system could be expanded almost indefinitely. The largest simulation booked 1,604,448 films in 1 hour and 31 minutes of computer time. Indeed, excessive size is not a limiting factor for the type of network envisioned. The larger the volume of titles and usage to be coordinated by the system, the greater the degree of benefit that could be expected to result from the system. It would be possible for the system to be too small for efficient operation. In practical terms, it could not conceivably become too large for efficient operation.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

This study set out to investigate the feasibility of computerizing the film booking, distribution and bookeeping procedures in the State of New York. There was a demonstrated need within the state for more effective and efficient practices in these areas of film utilization.* 14 BOCES, two State University Colleges, the State Education Department and Syracuse University combined forces with the USOE to accomplish this aim.

CONCLUSIONS

A computerized Film Library Network is feasible.

There can be no doubt that a computerized film library network for the State of New York is technically, economically, and educationally feasible. The performance of the computer programs for data capture, analysis and simulation developed for this study, demonstrate conclusively that the technical problems inherent in computerized film handling can be solved. The results of the data analysis and simulation runs prove the economic feasibility of a centralized system. The documentation of the present unmet needs for film along with the evidence indicating that a computerized network could better meet those needs testifies to the educational feasibility of the system.

In addition, a computerized network would provide numerous peripheral values for improving the use of instructional material. Some of those values would be: (1) a network would allow the immediate accessing of data on inventories and usage patterns for planning purposes, (2) cooperative use of resources could be achieved, (3) standardized coding and processing procedures would be possible, (4) hard copy records of requests, refusals, and confirmations, as well as daily "pull" and "due back" lists could be produced as a matter of course, and (5) common routines for film maintenance could be developed. Given these standardized capabilities, the continuous improvement of instructional materials resources within the schools of New York State could be planned in a consistent and intelligent manner.

An Electronic Data Transmission Network for New York State able to carry computer coded information, print media, still materials, video and audio recordings is feasible.

This statement cannot be documented fully by the results of this study. However, such a conclusion is not incompatible with the documented findings. Computers can now transmit data between distant points without human intervention. If films can be scheduled by computer so can audio and video tapes, filmstrips, slidesets, overhead transparencies and books. A network could readily provide for the scheduling of additional materials throughout the state without great additional charge. If the bandwidth and channel capacities of the system were adequately designed, the same network that handled the scheduling could also serve as a means for distribution of the material. In addition, such routine data processing tasks as class scheduling, attendance records, payroll, guidance functions, budget control, etc., could be facilitated by the capabilities of the network.

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* The University of the State of New York, Films for Teaching (Albany: The State University, 1963).

Film cannot continue to be the channel for the distribution of images in motion with sound to the schools of New York State.

This study projected 400,000 yearly bookings for a portion of the teachers and students of New York State. This projection indicated that a great many new prints would have to be added to film collections to meet this level of demand. Since the study could not possibly encompass all of the collections in the state, and since the simulations made their projections based on data collected from the SUFRL and 14 BOCES libraries, it is quite possible that the near future will see more than 400,000 bookings per year in New York State. If this is so, the print acquisition requirements would be an even greater expense to the educational system. In addition, the results of this study reveal that seasonal usage patterns, as well as the need for broad title inventories complicate the problem. New approaches to audio-video distribution are needed to alleviate the enormous cost of bringing New York State's film inventories up to the necessary levels.

Present dollar inventories of film in New York State are estimated at between 5 and 7 million dollars. The increase necessary for adequate film coverage of teacher needs would more than double the present figures. Additionally, the required inventory expansion would require more clerks and maintenance personnel as well as more directors. If all of the teachers seasonal requests were met on or very near their request dates, a vast amount of duplicate prints would have to be stocked by the BOCES and their backup libraries. These seasonal prints would tend to be booked less per year than other titles. Catering to seasonality would further increase film inventories and duplication, adding measurably to the total cost of motion picture use in New York State. Failure to cater to seasonality would abdicate an educational need.

RECOMMENDATIONS

Television and other means not now discovered or developed should be explored as possible solutions to the film dustribution problem.

New York State has well drawn plans for a complete multichannel educational television network. These plans include color transmission within five years. This network in combination with individual school closed-circuit television distribution would provide for extensive video dissemination facilities since present day coaxial cabling can carry many different signals at the same time.

Inexpensive videotape recorders can make a TV network work effectively at minimal cost. Six recorders can provide six channel options for a single school. If six or more teachers wanted to show six titles during a given hour, the six tape channels would be able to take care of the demand.

A major network similar to the one planned by New York State could be utilized for high speed tape distribution to local schools during late night hours. Most seasonal film titles could be available to meet teacher demand if the network made use of at least two statewide open circuit channels. In this way the actual investment in film titles could be reduced to less than six prints per title throughout the state, housed either in regional or centralized television centers. Carrying this hypothesis to its logical conclusion would permit the prediction that educational information could readily be distributed to all students, no matter what their age or achievement level, at whatever location they desired (home, school, industry) at will

Other industrial developments might offer even less expensive means for media presentation and dissemination. Under any circumstances, the computer based network tested in this study (and found to be feasible) forms the basic data link necessary to control whatever system proves most able to meet the fiscal and logistic needs of New York State's Educational System.

CHAPTER VI

SUMMARY

The title of this study "The Computer Simulation of a Statewide Film Library Network: A Feasibility Study for Actual Operation" clearly indicates its "raison d'etre." It was undertaken in an attempt to find some possible solutions to the problems of film utilization in the public schools of New York State. These problems are common to the rest of the nation.

Briefly stated these problems include: (1) the limited number of film titles actually available to teachers; (2) the great amount of time involved in ordering, booking, confirming and delivering the films requested by the teachers; (3) the inability of film libraries to meet the request date indicated by the teacher; (4) the extent of capital investment required to purchase and maintain adequate film collections; (5) the extensive overlap and duplication of film titles between regional and private libraries; (6) the lack of standardized procedures for purchasing, booking, confirming, and delivery of films; and (7) the lack of adequate means for collecting and analyzing data as an aid to long range planning for film services.

Despite efforts made by the Bureau of Classroom Communications, Division of Educational Communications of the New York State Educational Department and the individual county Boards of Cooperative Educational Services (BOCES) in New York State these problems persisted and it became increasingly clear that a master plan had to be devised. This study is, in part, an attempt to create such a plan.

The plan operates on the premise that a statewide film library network employing a centralized computer as the data control agent can alleviate many of these functional difficulties.

Data was gathered on film library inventories, booking records, teacher preferences and system costs. Computer programs were written to input and analyze this data. Simulation programs were designed to project data into the future using Syracuse University Film Rental Library (SUFRL), BOCES, and teacher preference information. The simulations attempted to (1) see if the SUFRL could backstop current BOCES rejected requests, (2) determine the ability of the SUFRL to backstop total BOCES requests, (3) double and triple those requests, and (4) to project to the time when New York State might change from BOCES to 20 larger Access Centers incorporating from 3-5 BOCES.

RESULTS

There were 5,492 titles of 16,372 prints held by the 14 BOCES, the SUFRL and two State University of New York colleges. Of the 5,492 titles, 3,393 were held exclusively in BOCES collections. There were no titles held in common by all 17 libraries and only 38 titles were found in over 10 collections. Seasonal films (those film titles having 90% of their bookings in a 5 month period) made up about 15% of the BOCES and SUFRL bookings. Teacher preference as indicated in the teacher survey showed a marked increase to a 37% seasonal demand.

Both the BOCES and SUFRL tended to spread out bookings over an entire school year. Their pattern of light, medium, and heavy usage followed a normal curve. The teachers own preference, however, completely contradicted the normal curve. Their desires were spread over a large number of different titles thus increasing the supposed low usage parameter. This resulted in a linear, negative sloping usage curve, since it raised low usage, lowered medium usage, and agreed with BOCES and SUFRL heavy usage patterns.

The first simulation (live) found that the SUFRL, using truck delivery service and eliminating all of its present out-of-state rentals could backstop 54.5% of BOCES rejected requests on the exact day wanted. The second simulation (live) booked some 66,000 BOCES requests with only 7% rejected requests. The third and fourth simulations (generated) demonstrated the ability of the SUFRL to handle 133,861 and 198,028 bookings with the addition of 5,049 and 11,217 prints respectively. The last simulation of 20 Access Centers or 400,000 bookings had the highest success figure of all and, most strikingly, the computer handled the 1,604,448 transactions (401,112 on each of 4 delivery parameters) in only 1 hour and 31 minutes.

CONCLUSIONS

Four basic conclusions were drawn from an analysis of the results of the study.

1. It is feasible to utilize a central computerized booking, distribution and bookeeping system for all educational organizations in New York State. Powerful computer programs were written and debugged to provide for inventory input-output, booking, and simulation for predictive purposes.

2. A comparison of the costs of a computer system to replace present procedures of using directors and clerks showed that:

   a. The computer network, while relatively expensive to to establish, would show marked advantages once in service.

   b. It could operate with less error than comparable human systems.

c. It would increase present costs because none of the BOCES would be able to drop personnel.

d. It would, however, release the highly trained Audio-visual specialist-Director from the onerous tasks of library supervision to perform his more necessary function of Educational Media leader, consultant and guide.

e. As the system expanded and film demand and usage grew, the costs of the computer network would fall far below the costs of human components.

f. The efficiency of the booking and bookeeping components provide a service to New York State never before available and at a considerable saving over any other type of system.

3. The study demonstrated the ability of the SUFRL to combine its holdings with the 14 BOCES as an effective backstopping and support system. This was particularly true when two-day truck deliveries were substituted for the normal one-week deliveries expected from the U.S. Mails.

4. The simulation phase of the study indicated that the system could be expanded to include all film libraries in the State of New York with ever increasing booking, distribution and cost efficiencies.

RECOMMENDATIONS

The findings of this study demonstrated the feasibility of a computer based film library network for New York State. It remains to be seen whether a theoretical study based on data gathered from a limited sample of data can be put into actual operation. The continuation of this study into an operational phase would seem to be a logical conclusion. It is recommended that a prototype system for a computer based statewide film library network be put into operation. If work began immediately, parallel computer booking of several BOCES in the first half of 1966-67 with full operational booking in from 5 to 10 libraries as well as the SUFRL by late spring 1967, would be possible.

It is recommended that more data be collected to verify the findings of this present study over a large amount of data. There are over 40 major private and public film libraries in New York State. To create a working film library network, inventory, booking, and distribution data must be reviewed using present programs to confirm the preliminary system analysis accomplished in this study.

It is recommended that other means of distributing audio-video images be developed. Analysis of teacher preference patterns indicate two major factors: (1) teachers desire films along lines encouraging uneconomical utilization of prints, and (2) a tremendous increase in film usage must be expected to accompany increased availability. The last simulation run based on 400,000 bookings indicated a need for 30,572 new prints at costs of over $4,500,000. This increase in prints does not reflect additional increases in new titles that might amount to another $1,000,000. Increases in films and prints require more libraries, clerks, and media directors under present conditions. Under any circumstances, more storage space and more maintenance and delivery personnel will be needed at enormous and almost unestimable cost.

New York State expects to have a multiple-channel color television network in operation within five years. This network should cover better than 95% of the educational agencies in the state. Videotape recorders should be relatively inexpensive within five years permitting every school system in New York to operate cooperative closed-circuit systems. Afterhours videotape transmission could place any film title in any school system in the state when requested by the teacher. This flexibility would take care of the expensive seasonality patterns as well as providing a much broader selection of titles. It is conceivable, under this alternative to film libraries, that only a few prints of each title would have to be maintained in one centralized, automated, media center.

Hopefully, other alternate solutions may be developed by cooperative arrangements between education and industry, therefore, it is recommended that explorations of new devices for media display be undertaken as soon as possible.

A film library network for New York State controlled by a centralized computer is feasible and practical. It seems reasonable to conclude that a network that can handle the complexities of film booking, distribution, and bookeeping could also expand its data handling to include all forms of instructional media from slides to books. This study has opened the door for further exploration of data transmission networks. It is to be hoped that this research will be continued successfully.

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LIST OF COOPERATING BOCES LIBRARIES

IDENT. ADDRESS

01 ALLEGANY COUNTY

William Farnsworth
BOCES, 6 South Street
Belmont, N.Y.
Belmont 79633

02 CATTARAUGUS COUNTY

Edgar T. Clark
BOCES, 124 Main Street
Little Valley, N.Y.
716 938-6158

03 CHAUTAUQUA COUNTY

Francis Tonello
BOCES, Village Hall
Fredonia, N.Y.
716 679-1515

04 * ERIE COUNTY # 1

Norman Johnson
BOCES, Erie Co. # 1
99 Aero Drive
Buffalo 25, N.Y.
716 634-3333

05 * ERIE COUNTY # 2

Norman Stadler
BOCES, Erie Co. # 2
Orchard Park H.S.
Orchard Park, N.Y.
716 662-9311

06 HERKIMER COUNTY

John Button
BOCES, 132 German St.
Herkimer, N.Y.
315 886-1781

07 * LEWIS COUNTY

Burt Green
BOCES
Lyons Falls, N.Y.
315 348-2331

IDENT. ADDRESS

08 MONROE COUNTY

Kenneth F. Harris
BOCES, 2596 Baird Road
Penfield, N.Y.
716 586-7008

09 ORANGE COUNTY

Bruce Hoag
BOCES, 6 Clinton Ave.
Warwick, N.Y.
914 986-3407

10 RENSSELAER COUNTY

Joseph Horton
BOCES, 964 Hoosick Road
Troy, New York.
518 279-3408

11 SUFFOLK COUNTY # 2

Dick Arata
BOCES, 201 Sunrise Highway
Patchoque, N.Y.
516 475-0570

12 * SUFFOLK COUNTY # 3

Paul F. Dupuis
BOCES, Deer Park Ave.
Huntington, N.Y.
516 427-4200

13 * WESTCHESTER COUNTY # 1

Robert Taylor
BOCES, 845 Fox Meadow Rd.
Yorktown Heights, N.Y.
914 245-7031

14 * WESTCHESTER COUNTY # 2

Carson Graves
BOCES, 17 Berkley Drive
Port Chester, N.Y.
914 437-3820

* Indicates a library from which booking [illegible] were gathered and analyzed.

APPENDIX B

LIST OF STATE COLLEGE LIBRARIES

IDENT. ADDRESS

15. THE STATE UNIVERSITY OF NEW YORK AT BUFFALO

Thayer Razik, Director
AV Communications Center
Educational Film Library
Buffalo, New York 14214

16. THE STATE UNIVERSITY COLLEGE AT BUFFALO

H. Gene Steffen, Director
Film Rental Library
1300 Elmwood Avenue
Buffalo 22, New York

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3. Godfrey, Eleanor P. "Audiovisual Equipment and Materials in U.S. Public School Districts--Spring 1961,"A preliminary tabulation prepared for the U.S. Office of Education, Washington: Bureau of Social Science Research, 1961.

4. Graves, Carson Hobart, An Evaluative Study of Certain Factors Related to Motion Picture Film Usage by Teachers in the Schools of Second Supervisory District of Westchester County, New York, unpublished Ph.D. dissertation, Syracuse University, 1964. pp 231ff.

5. Kim, Choong Han. "A Study of Public Library Film Services." Unpublished Ph.D. dissertation. Rutgers--The State University, 1964.

6. Rees, David in Films for Education, published by the University of the State of New York, Albany: The State Education Department, 1963, pp

LIST OF COOPERATING BOCES LIBRARIES

IDENT. ADDRESS

01 ALLEGANY COUNTY

William Farnsworth
BOCES, 6 South Street
Belmont, N.Y.
Belmont 79633

02 CATTARAUGUS COUNTY

Edgar T. Clark
BOCES, 124 Main Street
Little Valley, N.Y.
716 938-6158

03 CHAUTAUQUA COUNTY

Francis Tonello
BOCES, Village Hall
Fredonia, N.Y.
716 679-1515

04 * ERIE COUNTY # 1

Norman Johnson
BOCES, Erie Co. # 1
99 Aero Drive
Buffalo 25, N.Y.
716 634-3333

05 * ERIE COUNTY # 2

Norman Stadler
BOCES, Erie Co. # 2
Orchard Park H.S.
Orchard Park, N.Y.
716 662-9311

06 HERKIMER COUNTY

John Button
BOCES, 132 German St.
Herkimer, N.Y.
315 886-1781

07 * LEWIS COUNTY

Burt Green
BOCES
Lyons Falls, N.Y.
315 348-2331

IDENT. ADDRESS

08 MONROE COUNTY

Kenneth F. Harris
BOCES, 2596 Baird Road
Penfield, N.Y.
716 586-7008

09 ORANGE COUNTY

Bruce Hoag
BOCES, 6 Clinton Ave.
Warwick, N.Y.
914 986-3407

10 RENSSELAER COUNTY

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BOCES, 964 Hoosick Road
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Dick Arata
BOCES, 201 Sunrise Highway
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516 475-0570

12 * SUFFOLK COUNTY # 3

Paul F. Dupuis
BOCES, Deer Park Ave.
Huntington, N.Y.
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13 * WESTCHESTER COUNTY # 1

Robert Taylor
BOCES, 845 Fox Meadow Rd.
Yorktown Heights, N.Y.
914 245-7031

14 * WESTCHESTER COUNTY # 2

Carson Graves
BOCES, 17 Berkley Drive
Port Chester, N.Y.
914 437-3820

* Indicates a library from which booking [illegible] were gathered and analyzed.

APPENDIX C

TITLE AND FUNCTION LIST OF COMPUTER PROGRAMS

Inventory Audit Programs

The inventory audit takes punch card input and creates a master inventory file on magnetic tape. Each record contains complete data on title, sequence number, distributor, prints, and library. Separate records are kept for each library. Title and distributor are put in on the first entry. Subsequent entries need only sequence number, library identification, and number of prints.

Booking Audit Program

The booking audit takes punched card input, one card per booking, and creates a magnetic tape booking file. Input is batched by library. All records are checked against the inventory file to assure presence of the title in the library in question, and are audited for internal consistency.

Combined Run Program

The combined run takes magnetic tape input from the inventory and booking files and produces printer output showing holdings and usage levels by titles across libraries. Separate columns accomodate 15 libraries in a single run. If additional runs are needed summary columns are provided to carry aggregate information from preceding runs. Number of prints and number of bookings is shown by title for each library. In addition, summary statistics show light, medium, heavy, and seasonal usage totals for titles, prints, and bookings.

Statistics Program

The statistics run is designed to perform detailed analysis on booking records. Input is by magnetic tape. Both booking and inventory files are used as input. Separate outputs may be made for individual libraries, for pooled information from groups of libraries, or for specific titles by input codes across any combination of libraries. Selection is determined by central card input. Output consists of both tape and printer output. Twenty-eight summary statistics of aggregate usage are available plus title by title profiles of usage levels and distributions. Density functions are computed for each title and stored on magnetic tape for later use in the simulation runs.

Simulation Program

The simulation run utilizes information on holdings, usage, and distributions (density function) produced by the earlier runs to generate hypothetical usage along patterns dictated by actual usage. Any level of usage desired may be generated, patterned after any set of data from preceding programs. Two major subroutines are utilized by the simulation program. They are:

1) Data Generation Subroutine: This subroutine utilizes control card input and generates a complete set of tables for computing all data information required in booking film. Provisions are made for holidays, vacations, regents exams, etc. Request day, ship day, return day, and last available day, all may be determined by simple table lookup from the output of the data generation subroutine. The tables provide for delivery times from 2 to 7 days, and for a use period from 2 to 5 days.

2) Film Booking Subroutine: The film booking subroutine utilizes the output of the data generation subroutine to book film and maintain a record of those bookings. Any number of prints of a given title may be included. The subroutine will attempt to book the request first on the exact day. Failing that, it will attempt to book a request on an alternate date within a maximum range set by control card input. A complete record is kept of all unencumbered data ranges for each print.

The simulation program may also be used as a regular booking program for simulation purposes utilizing actual records of usage and/or refusals as input. Such simulation runs may be used to test the extent to which one library might have been able to backstop the unfilled requests from other libraries, and for similar purposes.